Low Level Design

Blockchain Enabled Supply Chain Tracker for E-commerce

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# Introduction

## What is a low level design document?

The Low-Level Design Document (LLD) is used to give the internal logical design of the E-voting System's actual computer code. Class diagrams, containing methods and interactions between classes, as well as programme requirements, are all described in LLD. The modules are explained in such a way that the programmer may write the programme straight from the manual.

## Scope

The programme flow and the sequences in which the modules operate must be covered in the document. This method may be used to the creation of data structures, software architecture, and source code. The many modules that may be coupled together to give extra functionality are not included in this paper.

# Architecture

## RFID for Data

We tag each shipment consignment with RFID tags that can be scanned at each nodal junction/checkpoint. Each scan will act as a new record for our supply chain tracking process starting from procurement of the material/product from vendor followed by inventory management and finally at the time of distribution channel for end user delivery.

## Initial Data Storage

The tracker records will be updated in an RDBMS server handled by organisation. This will also include the data before creating Purchase Receipt so as to ensure genuenity of our product from its time of inception.

## Data Verification

While updating data at each junction we need to validate the data provided for consistency and ensure that there are no discrepancy. We can even use some kind of AI/ML based solution to automate this task if required at a later stage.

## Mining Block

It is the method of determining a nonce that meets the HASH requirements. The government is believed to be the one that builds and maintains the blockchain under this design. When the government receives the documents, they mine a block with the necessary information.

## Proof of Work

Once the hashkey is produced, it is validated for the preset sequence when mining a block. The evidence of work is complete after the criteria is met. If not, the hashkey is produced again.

The Hashing Algorithm consists of the following steps: SHA-512 is a cryptographic hash algorithm.

In comparison to SHA 256, which contains 64 characters, SHA 512 has 128 characters.

## Adding Data to Block AND Blockchain

Once the proof of work is completed successfully, the verified data documents are added to the block. This block will be then added to our blockchain making it immutable.

## Broadcasting the updated blockchain

The updated blockchain is now being broadcast to all the nodes (banks) in the network. This is done by replacing the blockchain of all the nodes with the new blockchain along with the added block.